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THE PRODUCTION OF SUGAR BEETS IN SOUTHWESTERN ONTARIO

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AN ECONOMIC STUDY

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Marketing Service - Economics Division

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THE
PRODUCTION OF SUGAR BEETS IN SOUTHWESTERN ONTARIO

The production of sugar derived from sugar beets grown in Canada has averaged 125 million pounds annually in recent years. The principal areas of production are the several counties in the extreme southwestern part of Ontario and the irrigated sections of southwestern Alberta. In these areas approximately 50 thousand acres of sugar beets are grown by several thousand producers. The crop is an important one in the farm production programme and contributes substantially to the economic development of the adjacent urban centres. The importance of sugar in the diet of Canadians also suggests the significance of the industry to the consuming public at large.

The study upon which the information contained in this report is based was undertaken at the request of sugar beet growers in the Counties of Lambton, Kent and Essex in southwestern Ontario. The request was conveyed to the Department of Agriculture through the several producers' associations. The study was undertaken in the early summer of 1939 and its purpose was to determine the general economic status of farmers in the areas in question and the contributionthereto made by the production of sugar beets; also to obtain the cost per acre and per ton of producing sugar beets.

Area and Scope of Survey

While sugar beets are grown extensively in the counties already mentioned, and also in Middlesex County, the main centres of production are located in close proximity to the refineries situated at Chatham and Wallaceburg. There is also some concentration of production in the Blackwell area of Lambton County near Sarnia and in the Tilbury area of Essex County. The concentration of production in these several areas suggested a regional basis for analysis. Five such regions have been designated and for purposes of discussion throughout the report will be referred to as Chatham, Wallaceburg, Sombra, Sarnia and Tilbury.

A total of 205 records were taken from individual farmers. In view of the fact that securing the record of the complete farm business took a considerable amount of the farmer's time and because of the busy season in which the records were taken, 65 farmers co-operated only to the extent of providing details on the cost of producing sugar beets. Out of the total sample of 205 records, there were 140 records giving complete details of the financial operations of the farm for the twelve month period ending April 30,1939. Of the latter, 139 provided cost data, which when added to the 65 already mentioned provided a total of 204 records for cost analysis.

In preparing this report on the analysis of the records secured in the course of the survey, an effort has been made to provide sufficient information on the general farm business to give a picture of farming conditions in the various areas included in the study, to discuss those factors which influenced the financial success of farmers in the area and to show the importance of the sugar beet crop to the area. In the second section of the report the details of the cost of producing sugar beets are presented. Supplementary to this report, a more general treatment of the information has been prepared for wider distribution to farm operators and other interested parties.

It must be borne in mind that the figures collected in this survey apply only to the year ended April 30,1939. In any particular year the financial results of farming are subject to change as a result of differences in weather conditions, prices and other factors. The year studied was a satisfactory one from the standpoint of weather, and crop yields were somewhat above average. The average yield per acre of sugar beets was 10.4 tons compared with an average of 9.8 tons for the six-year period of 1933-1938. The weather during the harvesting period for sugar beets was good and this would have the affect of reducing harvesting costs. In some years wet weather at that season causes considerable marketing difficulty.

General Description of the Area

The agriculture of the Counties of Kent, Essex and Lambton may be classified as a cash crop type of farming, although livestock is kept on most farms to utilize surplus feed production and to round out the complete farm business. The soils of the area are considered to be among the most productive in the province and the level topography and high percentage of tillable land makes the area well adapted to cash crops. The climate is typified by a long growing season with adequate rainfall and the area has long been important for the production of corn for grain.

The Sugar Beet Industry

Sugar beet production was introduced into the area in 1902 with the establishment of a sugar beet factory at Wallaceburg, a second factory was also openend in Dresden in that year, but was closed after two years of operation. The Chatham factory was opened in 1916. The acreage of sugar beets grown in Ontario since 1925 has varied from twenty one thousand acres to thirty eight thousand acres. The wide variations in acreage may be accounted for by changes in the prices paid for sugar beets and the relative prices farmers were receiving for other crops produced in the area. The crop is grown under contract between the grower and the company operating the factory. The acreage is contracted for at the beginning of the season with a fixed basic price for beets testing 14 per cent sugar; an additional 25 cents is paid for each one per cent increase in sugar content. There is also a feature in the contract which provides for an additional price bonus when the average net selling price obtained for sugar rises above $4.00 per hundred pounds. The acreage, tons delivered and average prices paid to growers, including bonus, for the period 1925 to 1938 are shown in Table 1.

Table 1. Acreage, Tons Delivered and Price per Ton of Sugar Beets Grown in Ontario 1925-38

Year	Acreages (1)	Tons delivered (1)	Price per ton (2)
1925	29,409	328,582	6.62
1926	24,970	230,505	7.02
1927	21,571	172,811	8.51
1928	29,142	207,[illegible]	7.41
1929	24,272	193,555	8.30
1930	26,922	270,468	7.88
1931	31,382	330,720	6.63
1932	30,888	354,940	5.73
1933	30,034	304,933	5.93
1934	24,380	237,606	5.70
1935	38,056	320,414	5.57
1936	34,398	349,041	5.56
1937	26,840	185,000	5.62
1938	28,200	276,000	6.92

(1) Dominion Bureau of Statistics.

(2) Canada and Dominion Sugar Company.

Farms Included in the Study

The farms included in the study conducted by the Economics Division were taken as a random sample, simply by calling at all farms along a road and taking records where the farmer was a grower of sugar beets and where he was willing and able to give his time for the completion of the records. Every effort was made to avoid a sample which would be biased in any way. The records taken include growers who contracted for only small acreages as well as a number of those growing large acreages. Information was secured from growers of many different nationalities.

Capital

The capital investment in real estate, equipment, livestock, feed and supplies, was estimated by the farmers visited and is shown in Table 2. For all farms the real estate valuation averaged $7,873 or 72.6 per cent of all capital. This investment was highest in the Chatham area, mainly because of higher land values resulting from greater productivity. The value of land represented 60 per cent of the total real estate value for all farms. Since land is a more productive form of capital than buildings, especially when the farm home is included in buildings, it would seem desirable to have a relatively high proportion of the real estate capital represented by land.

Table 2. Value of Capital per Farm End of Year,
140 Farms, Lambton, Kent and Essex.
1938-39

	Chatham	Wallace-burg	Sombra	Sarnia	Tilbury	All farms
	$	$	$	$	$	$
Buildings	3,541	3,131	3,108	2,970	3,064	3,143
Land	6,733	4,872	4,346	3,955	4,191	4,730
Total Real Estate	10,274	8,003	7,454	6,925	7,255	7,873
Livestock	1,422	1,293	1,251	1,042	1,453	1,281
Equipment	1,508	1,784	1,261	1,442	1,482	1,506
Feed and Supplies	215	169	172	95	79	141
Total Capital	13,419	11,249	10,138	9,504	10,269	10,801

The investments in livestock averaged $1,281 per farm for all farms. In this case the highest investment per farm was in the Tilbury area, although in the Chatham area the value of livestock was only slightly lower. In the Sarnia area crop production recieved more emphasis and livestock values were relatively low. In this connection it should be pointed out that the sugar beet area near Sarnia is limited largely to the Blackwell area and is not representative of the County of Lambton as a whole.

The average investment in machinery and equipment was $1,506. There was considerable variation in this item as between the areas studied due largely to differences in the cropping system and type of farming generally. The inventory of feeds and supplies on hand at the end of the year consisted largely of feed grains on farms which was held over for summer feeding.

On a per acre basis the average value of real estate was $69.43. Of this total $41.71 was for land and $27.72 for buildings. The per acre value of both land and buildings was highest in the Chatham area. There was little variation in valuations between the other areas of the study.

The amount of capital invested in an operating farm business may have an important bearing on the financial success of the farm. Capital invested in land and buildings may be considered as fixed capital, while that invested in livestock, equipment and feeds could be classed as sinking capital. It would seem advisable that the percentage of total capital in the form of working capital should be kept as high as possible. Many farmers find it difficult to adjust their farm business to meet changed requirements because of the lack of working capital.

Table 3. Value of Real Estate per Acre,
140 Farms, Lambton, Kent and Essex.
1938-39

	Chatham	Wallace-burg	Sombra	Sarnia	Tilbury	All farms
	$	$	$	$	$	$
Land	66.27	40.53	38.56	35.53	35.67	41.71
Buildings	34.85	26.05	27.58	26.68	26.08	27.72
Total Real Estate	101.12	66.58	66.14	62.21	61.75	69.43

Use of Land

The 140 farms included in the study on which complete information was collected represented a total land area of 16,236 acres. Of this area, 12,060 acres were devoted to crop production during 1938, the balance being pasture, woods, farmstead and waste land. The total acreage of sugar beets grown was 1,411 acres.

The acreages of the various crops per farm and the number of farms growing individual crops is presented in Table 4. For the entire area, the farms had an average of 86.1 acres in crops. The greatest acreage was in wheat,averaging 18.6 acres. The wheat crop is grown mainly for sale as a cash crop although a considerable volume of the production is utilized as feed on the farms. The corn crop with an average of 16.8 acres, is an important cash crop in the area,although not as important in Lambton as in Kent and Essex Counties. These Counties produce the greater part of the seed corn and grain corn grown in the province. The oat crop is grown chiefly as a feed grain as is the mixed grain, (oats and barley grown in combination). The average acreage of sugar beets was 10 acres per farm.

In Table 5, the number of farms growing the various crops in each area and the average acreage on those farms where the particular crop was grown is shown. There were,in all, thirty five different crops being grown by farmers included in this study. While many of these crops were grown by only a few farmers,never-

Table 4. Crop Acres, Lambton, Kent and Essex Counties, 140 Farms Studied. 1938-39

Crop	Average per farm all farms	Farms with crop	Acres per farm with crop
Wheat	18.6	130	20.0
Oats	14.7	123	16.8
Barley	4.5	69	9.1
Mixed grain	3.4	37	12.9
Rye	.1	3	6.7
Buckwheat	.2	4	6.7
Field beans	1.1	11	15.6
Corn silage	1.2	19	8.7
Corn fodder	.8	13	8.6
Corn grain	14.8	113	18.3
Potatoes	1.3	55	3.4
Turnips	-	3	.5
Mangolds	.2	25	.9
Sugar beets	10.1	139	10.1
Alfalfa	5.6	87	9.0
Alfalfa seed	.8	14	8.0
Clover and Timothy	3.4	55	8.7
Other hay	1.4	27	7.5
Clover seed	1.2	20	8.4
Timothy seed	-	1	1.0
Cover crops	.3	3	14.3
Bare summerfallow	.7	12	8.0
Apples bearing	.4	27	1.9
Apples not bearing	.1	8	1.5
Other tree fruit	.1	7	1.1
Small fruits	-	5	.8
Vegetables	.3	74	.6
Tobacco	.7	15	6.9
Tomatoes	1.2	29	5.8
Onions	.1	6	2.7
Strawberries	-	3	.7
Soya beans	.5	10	6.7
Cauliflower	-	1	2.0
Spinach	.1	2	3.5
Broom corn	-	1	3.0
Cabbage	.1	2	3.5
Sweet corn	.1	3	2.8
Cucumbers	-	3	2.3
Sorghum	.1	2	3.0
Lima beans	.1	1	10.0
Millet	.1	1	6.0
Beets, red	-	1	1.0
Total	88.4	140	---
Acres double cropped	2.3	--	---
Acres in crop	86.1	--	---

theless it was demonstrated that these crops could be grown and that a very wide choice of crops was open to individual producers. Corn, either for grain, fodder or silage, was being grown on 132 farms of the 140 included in the study. Wheat was being grown by 130 farmers and oats by 123. Somewhat over half of the farmers were growing alfalfa hay rather than clovers or timothy. The cropping system which was followed on individual farms varied widely, each farmer finding it necessary to meet the peculiarities of his own farm and to provide for a rotation of crops over a period of years. It is impossible to set up any cropping system and say that it will bring the most satisfactory results. The most satisfactory system for any individual farm will be that one which is most adaptable and which fits in best with the livestock and other enterprises of the farm as a whole. Generally speaking, the results of the study show that for financial success a fairly high proportion of the crop area should be devoted to such cash crops as wheat, sugar beets, beans or tobacco, which provide a relatively high return per acre. However, these crops required large amounts of labour and must be limited to meet the available labour supply unless additional labour can be secured at satisfactory rates.

While the general cropping system of the farms in the different areas was essentially the same, there were some important differences in the area devoted to the various individual crops. Beans were grown only in the Chatham and Wallaceburg area. Tomatoes

Table 5. Number of Farms Reporting Crops and Acres per Farm with Crop, by Areas, Lambton, Kent and Essex Counties, 1938-39.

	Chatham		Wallaceburg		Sombra		Sarnia		Tilbury		All Farms	
	No.	Ac.	No.	Ac.	No.	Ac.	No.	Ac.	No.	Ac.	No.	Ac.
Wheat	21	21	30	21	24	21	22	18	33	19	130	20
Oats	20	16	26	14	21	17	23	14	33	21	123	17
Barley	2	7	20	11	15	8	16	7	15	11	68	9
Mixed grain	7	13	13	17	7	13	6	6	5	8	38	13
Beans	8	19	3	5	-	—	—	—	—	—	—	—
Corn	23	21	31	21	24	11	21	9	33	23	132	18
Potatoes	4	1	12	1	9	1	26	6	4	1	55	3
Sugar beets	23	11	30	13	24	8	29	11	33	7	139	10
Alfalfa	13	12	23	7	19	9	19	10	13	9	87	9
Other hay	10	6	13	8	14	9	16	8	25	12	78	9
Tobacco	7	4	4	10	—	—	—	—	4	8	15	7
Tomatoes	9	8	8	6	—	—	—	—	12	5	29	6
Other crops	17	2	20	2	22	3	27	5	22	4	108	3
Total Crop Acres	23	92.4	31	94.3	24	80.4	29	68.1	33	94.0	140	86.1

and tobacco were reported in these two areas and in the Tilbury area of Essox County. Sugar beet acreage was greatest in the Wallaceburg area with 13 acres per farm; in the Tilbury area the sugar beet acreage averaged only 7 acres per farm.

Crop Sales

The sale of cash crops on the 140 farms included in the study amounted to a total of $193,790 or an average of $1,384 per farm. The operators' share of these sales averaged $1,311 and approximately 50 per cent of the total cash receipts of these farms. Sales of sugar beets accounted for 49.3 per cent of the total crop sales. This percentage would be somewhat above the average for all farms in the area as only farms growing sugar beets were included in the study. Sales of wheat which averaged $185 per farm and 13.6 per cent of all crop sales, were important in all five geographic areas into which the farms have been sorted. The low price recieved for the 1938 wheat crop reduced the returns from this crop below what might be considered as normal. Sales of oats, barley and mixed grains were not important. Barley in some years is of high quality and meets the requirements of the malting trade, but this is not sufficiently dependable to make it an important cash crop. Beans were important in the Chatham area. This crop is largely grown in the area bordering Lake Erie although there is a considerable acreage just north of the City of Chatham. Corn is most important as a cash crop in Essex County, although sales of this grain were also important in the

Kent County areas included in the study. Potatoes were important as a cash crop only in the Sarnia area. The percentage of crop sales represented by sugar beets was highest in the Sombra area. This might be expected because of the location of the factory in this area and the fewer alternative crops available to farmers in the area. The production of tobacco and tomatoes in the Chatham area reduced the percentage of returns from sugar beets although the average returns from beets were $774 per farm in this area. In Table 6, crop sales per farm, various crops and numbers of farms reporting sales are shown. The differences which existed between the five areas are presented in Table 5.

Table 6. Crop Sales and Farms Reporting Sales, 140 Farms Studied. 1938-39

	Average per farm all farms	No. of farms	Average per farm reporting
	$	No.	$
Wheat	185	101	256
Oats	22	33	93
Barley	39	38	145
Mixed grain	4	5	116
Field peas	1	2	66
Field beans	32	10	448
Corn Silage	2	1	285
Corn fodder	1	1	100
Corn grain	133	64	291
Potatoes	54	33	228
Sugar beets	682	139	687
Alfalfa	4	10	52
Alfalfa seed	1	5	22
Clover and timothy	1	3	31
Clover seed	7	14	70
Apples	2	5	57
Other tree fruits	-	2	25
Small fruits	1	2	77
Vegetables	2	3	92
Tobacco	101	15	941
Tomatoes	72	27	375
Onions	18	5	503
Strawberries	1	2	90
Soya beans	5	2	350
Cauliflower	1	1	92
Spinach	1	2	93
Broom corn	1	1	144
Cabbage	3	2	186
Sweet corn	2	3	83
Cucumbers	2	3	95
Lima beans	3	1	438
Beets, red	1	1	128
Total	1,384	140	--
Operators' sales	1,311	--	--
Landlords' sales	73	--	--

Table 7. Farms Reporting Crop Sales and Average per Farm with Sales, Lambton, Kent and Essex Counties. 1938-39

	CHATHAM		WALLACEBURG		SOMBRA		SARNIA		TILBURY		ALL FARMS	
	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$
Wheat	19	265	25	304	16	226	16	293	26	191	102	254
Oats	5	79	4	61	5	56	5	82	14	125	33	93
Barley	2	152	12	171	8	142	4	161	12	114	38	145
Mixed grain	2	72	2	173	1	90	-	—	—	—	5	116
Beans	8	544	3	175	—	—	—	—	—	—	11	443
Corn	12	339	14	333	10	217	—	—	28	280	64	293
Potatoes	3	78	5	72	3	18	21	326	1	25	33	228
Sugar beets	23	806	30	922	24	606	29	748	33	398	139	687
Alfalfa and seed	3	43	1	20	3	28	3	36	3	96	13	49
Other hay and seed	—	—	1	81	7	74	—	—	8	60	16	68
Tobacco	7	702	4	1,397	—	—	—	—	4	922	15	941
Tomatoes	8	438	7	367	—	—	—	—	12	338	27	375
Other crops	10	208	3	20	—	—	11	294	5	140	29	209
Total Sales	23	1,899	31	1,668	24	938	29	1,297	33	1,160	140	1,384

Livestock

While cash crop production was relatively more important in this area than in most sections of Ontario, nevertheless, since 44 per cent of the cash receipts were received from the sale of livestock and livestock products, it will be seen thatthis enterprise makes a very substantial contribution to the farm income. In addition, all farms kept sufficient livestock to provide dairy products and eggs for the farm home.

On all but one farm horses were kept to supply at least a part of the farm power. This power was supplemented by tractors on 56 of the farms. On the average, farmers maintained four horses per farm. While the level topography and regularity of fields lends itself to efficient tractor operation, it is doubtful if the tractor will supplant horses to a very much greater extent than at the present time. Thirty nine farmers were raising colts on their farms.

Table 8. Horses on Farms, Purchases, Sales and Losses on 140 Farms Studied. 1938-39.

	Farms with stock	Beginning of year	Purchases	Sales	End of year	Losses
	No.	No.	No.	No.	No.	No.
Work horses	139	486	37	3o	487	26
Colts	39	59	14	7	77	--
All Classes	139	545	51	37	564	26

The total number of work horses on farms was increased by one during the year, but numbers of colts were increased by 18.

Cattle - Numbers of cattle on farms decreased slightly during the year studied, although there was an increase in the number of pure bred cows. Since most of the cattle of the area are being raised for commercial beef production, there were only a few of the farmers keeping pure bred cattle. The surplus of feed grains produced in the area has resulted in a considerable importation of feeder steers and heifers into the area for winter feeding.

Table 9. Cattle on Farms, Purchases, Sales, Losses and Consumed on Farms, 140 Farms Studied. 1938-39.

	Farms with stock	Beginning of year	Purchases	Sales	End of year	Losses	Consumed on farm
	No.	No.	No.	No.	No.	No.	No.
Cows - Pure bred	14	103	13	18	112	---	1
Cows - Grade	126	667	35	145	631	8	1
Heifers	84	300	53	147	300	5	11
Steers	48	354	225	342	327	---	7
Calves	101	333	46	298	384	6	5
Bulls	38	41	8	22	40	---	1
All Classes	136	1,848	380	972	1,794	19	26

Dairy production on the farms visited was largely confined to the sale of cream and supplying the necessary dairy products for the farm home. Those farmers who maintained large herds of dairy cattle, producing fluid milk for city markets, were not usually growing sugar beets, and consequently were not included in this study.

Hogs - The hog enterprise received considerable attention on the farms visited and numbers of both sows and hogs on farms were increased during the year. Sows were kept on 106 of the farms and these farms had an average of three sows per farm. Other hogs and young pigs on those farms averaged 39 head.

Table 10. Hogs on Farms, Purchases, Sales, Losses and Consumed on Farms, 140 Farms Studied. 1938-39.

	Farms with stock	Beginning of year	Purchases	Sales	End of year	Losses	Consumed on farm
	No.	No.	No.	No.	No.	No.	No.
Boar	21	21	6	7	20	1	---
Sows	106	307	53	87	355	4	14
Hogs	49	495	127	2,143	,866	11	108
Pigs	79	1,583	177	1,334	1,564	3	34
All Classes	117	2,406	363	3,571	2,805	19	156

Sheep- The lack of available rough pasture in the area was probably responsible for the small number of farms on which sheep were being raised and the small size of those flocks which were reported. The number of ewes on farms declined during the year under review, largely because losses were not replaced by maintaining the ewe lambs.

Table 11. Sheep on Farms, Purchases, Sales and Losses, 140 Farms Studied. 1938-39.

	Farms with stock	Beginning of year	Purchases	Sales	End of year	Losses
	No.	No.	No.	No.	No.	No.
Ewes	8	51	9	22	44	6
Lambs	7	33	-	25	38	10
All Classes	8	84	9	47	82	16

Poultry- Hens were reported on 134 of the 140 farms visited. The farm flocks averaged 78 birds per farm. Most farmers purchased baby chicks in the spring to rebuild their flocks. Other poultry such as turkeys, ducks and geese were kept by 45 farmers. The poultry enter prise, while not exceptionally large in most cases, was generally well cared for and provided cash income from sales of poultry and eggs as well as providing meat and eggs for use in the farm home.

Table 12. Poultry on Farms, Purchases, Sales, Losses and
Consumed on Farms, 140 Farms Studied.
1938-39

	Farms with stock	Beginning of year	Purchases	Sales	End of year	Losses	Consumed on farm
	No.	No.	No.	No.	No.	No.	No.
Hens	134	10,405	214	7,549	10,209	59	1,985
Chicks	32	5,106	18,007	4,868	5,822	170	1,008
Other Poultry	45	456	12	1,101	499	6	258
All Classes	137	15,967	18,233	13,516	16,530	235	3,251

Beekeeping was not carried on extensively in the area, although there were three farmers visited who were maintaining an average of 39 hives of bees per farm.

The actual livestock enterprise on individual farms was subject to wide variation depending on the size of the farm and the organization of the farm business by the individual farm operator. On farms where adequate supplies of pasture and roughages were available, the beef cattle enterprise was more fully developed. On farms where feed grains, including corn, were available, most farmers were feeding substantial numbers of hogs. In this way farmers were organizing their business to make the best use of feed and other factors of production.

Livestock Sales

Sales of livestock during the year under review averaged 815 per farm. Hogs constituted the largest single item with sales averaging $408 per farm. Hog prices were relatively high during the year as compared with prices of most other farm products. Cattle sales averaged $283 per farm. This figure includes sales of steers made by a number of farmers who make a practice of buying feeder cattle in the fall of the year for feeding over winter. Poultry returns of $82 per farm were largely made up of sales of cockerels and old hens from the farm flock. Livestock sales, particularly hogs, were higher in dollars per farm in Kent County, although the enterprise was of considerable importance in all areas. Of the 140 farms included in the study, 138 farms sold at least some livestock. Sales of cattle were reported on 126 farms and sales of hogs on 120 farms. Only 6 farms reported sales of sheep or lambs. In addition to the average value of livestock sales for all farms, the number of farms reporting sales and the average per farm reporting are shown in table 13, also the table includes the number of each class of livestock sold and the average value recieved for each class.

Table 13. Sales of Livestock, 140 Farms Studied. 1938-39.

	Average per farm all farms	Farms with sales	Average per farm with sales	Number sold	Average value per sale
	$	No.	$	No.	$
Horses	21	21	141	30	99
Colts	3	5	95	7	68
Cows, pure bred	12	8	205	18	89
Cows, grade	40	69	81	145	38
Heifers	45	39	162	147	43
Steers	151	45	342	342	62
Calves	26	82	45	298	12
Herd Bulls	9	19	68	22	59
Sheep	1	3	52	22	7
Lambs	1	6	26	25	6
Boars	1	7	19	7	19
Sows	15	41	52	87	24
Hogs	408	119	480	3,477	16
Hens	45	67	93	7,549	0.83
Chickens	22	43	71	4,866	0.62
Other Poultry	15	39	55	1,011	1.94
All Stock	815	138	827	--	--

Table 14. Value of Livestock Sales per Farm on 140 Farms in Lambton, Kent and Essex Counties. 1938-39.

	Chatham $	Wallaceburg $	Sombra $	Sarnia $	Tilbury $	All Farms $
Horses	28	30	41	20	10	24
Cattle	361	396	227	300	148	283
Hogs	--	2	5	1	3	2
Sheep	628	530	490	144	394	424
Poultry	39	56	86	140	66	82
Total	1,056	1,014	849	605	621	815

Table 15. Sales of Livestock Products, 140 Farms Studied 1938-39

	Average per farm	Farms with item	Average per farm with item
	$	No.	$
Milk	119	18	925
Cream	99	95	146
Butter	11	8	183
Eggs	112	122	129
Breeding fees	--	3	6
Wool	--	3	6
Honey	5	3	216
Total	346	139	--

The income from the livestock enterprise was increased by an average of $346 from the sale of livestock products. The greatest amount was from the sale of fluid milk, although only 18 farmers sold this product. Cream and eggs were sold by most farmers and provided an average of $99 and $112 per farm. Farm products used in the farm homes were valued at an average of $103 per farm. The products were valued at market value at the farm.

Farm Expenses

Farm expenses may be grouped under three main headings: current operating costs; capital expenditures, and inventory decreases. The current operating costs are generally the most important from the standpoint of amount and because of the fact that they must be met each year. Capital expenditures may often be shifted from one year to the next depending on the financial position of the individual farm operator. Inventory decreases as non-cash expenses are not as apparent as are cash expenses, but if the capital of the farm is being depleted over a prolonged period of time the results will be serious.

Operating Expenses - The most important item of expense in this area was that of labour, the average cost being $342 per farm. In addition to hired labour, the work done by sons, brothers, fathers and other members of the farm family was valued at an average of $216 per farm. Taxes averaged $133 per farm. On the total acreage of the farms the average tax was $1.55

per acre. Next expense in importance was that of feed which averaged $94 per farm for all farms or $111 per farm for the 120 farms which reported this item of expense. Purchase of feed on these farms was made up largely of supplementary feed for swine and poultry. As would be expected in a cash crop area commercial fertilizer was an important expense item averaging $86 per farm. This item appeared on 137 of the 140 farms included in the study. The share of the costs of operating the automobile which are chargeable to the farm amounted to an average of $77 per farm. Autos were operated by all but 13 of the farm operators interviewed. The 56 farm operators who used tractors had average costs of $123 for this item. There were 34 farmers who rented either part or all of their land. These tenant farmers paid an average of $259 per farm in cash rent. Threshing costs averaged $47 per farm. Seed purchased averaged $48 per farm. Hired trucking, mainly for delivery of sugar beets was an expense on 99 farms and averaged $65 per farm on these farms.

Many other smaller items were listed in the cost of operating these farms. Electricity was used by 87 farmers and the farm share of this expense was estimated at $22 per farm. Taking all current operating costs together the average amount was $1,457 per farm. Expenses on individual farms would vary greatly from this average depending on the size and type of business being carried on.

Capital Expenditures.- Capital expenditures made during the year under study, averaged $573 per farm. This amount was made up of an average of $175 per farm for livestock purchases; $265 per farm for new machinery and equipment and $153 per farm for new buildings, land and improvements. It is difficult to estimate what these expenditures may amount to in any given year since they are often postponed during periods of low income and therefore become great in years when funds are available. From the standpoint of maintaining fairly uniform expenses from year to year it would seem highly desirable to spread capital outlays over the years as evenly as possible. However, since this is not always possible unless adequate credit is available it will be necessary to make replacements at such times as they can be financed.

Inventory Decrease .- Inventory decreases arise largely out of the depreciation of buildings and equipment. In may cases this depreciation is offset, in part at least, by repairs and improvements. The livestock account may also show an inventory decrease if there has been sales from the livestock enterprise greater than the natural increase in stock. While these farms had average inventory decreases of $185 per farm this item was more than offsetby the inventory increases as shown under receipts.

When operating costs, capital expenditures and inventory decreases were totalled the average total farm expenses amounted to $2,215 per farm. Here again there was a wide variation as between individual farms. Here again it may be stressed that it is not necessarily the absolute amount of these expenditures which add to

Table 18. Farm Expenses on 140 Farms in Lambton, Kent and Essex Counties. 1938-39

	Average per farm all farms	Farms with item	Average per farm with ite
	$	No.	$
Contract labour	130	110	166
Hired labour	166	117	199
Board hired labour	45	95	67
Unpaid labour	216	78	388
Taxes	133	129	145
Cash rent	63	34	259
Electricity (share)	14	87	29
Telephone (share)	6	87	10
Trucking	46	99	65
Pasturing stock	6	24	34
Horseshoeing	12	107	16
Veterinary	7	87	12
Feed grinding	29	121	34
Machine work	11	71	21
Threshing	47	100	66
Fertilizer	86	137	88
Twine	13	136	14
Insurance buildings	17	125	19
Tractor	49	56	123
Truck	13	8	221
Auto	77	127	85
Seeds	48	140	48
Repairs machinery	30	128	33
Repairs buildings	29	65	61
Repairs fences	16	75	29
Feed	94	120	111
Miscellaneous	54	140	54
Total current expenses	1,457	--	--
Livestock purchased	175	117	210
New Machinery and equipment	365	98	378
New buildings, land and improvements	133	51	365
Total capital expenses	573	--	--
Total farm expenses	2,030	--	--
Inventory decreases:			
Livestock	45	43	146
Feeds and supplies	5	14	53
Machinery and equipment	71	80	124
Real Estate	64	87	103
Total decreases	185	--	--
Total expenses	2,215	--	--

successful operations of a farm business, but rather the necessity of keeping receipts high relative to expenditures.

Financial Summary

A complete summary of the farm business for the twelve months ending April 30, 1939 is given in table 17. In the first part of the table a summary of cash receipts is shown. In all areas the most important source of cash income was the sale of crops. For the entire area this source accounted for approximately 50 per cent of the cash receipt Livestock and livestock product sales account for most of the balance of the cash income. Under miscellaneous receipts are included such items as labour off the farm, tractor work done for neighbours, threshing and other sources of non-farm income. The average total cash receipts for all farms was $2,629. The highest average was in the Chatham area with $3,213 per farm and the lowest was in the Sarnia area with an average of $2,097.

When the inventory is increased during the year the gain may be considered as a receipt although it is not in cash. Increases in real estate come about through the erection of new buildings or other permanent improvements and from the purchase of additional land during the year. Livestock inventories are increased for the most part by holding more stock at the end of the year than at the beginning. Machinery may be increased if new purchases are more than sufficient to offset depreciation. Feeds and supplies are increased by the retention of heavier stocks at the close of the year than were on hand at the beginning of the period. The average total inventory increase for all farms was $468, made up about equally from the various sources mentioned above. When inventory increases are added to total cash receipts the total average farm receipts amounted to $3,097.

Turning to the expenses, the total average current expenses on the farms included in the study was $1,457. This amount includes hired labour, contract labour and the value of unpaid family labour. The unpaid family labour is included to make farms where one or more sons are available to assist the operator comparable with those farms where hired labour must be employed. Unpaid labour was included at the rate which it would have been necessary to pay to replace this labour. Board of paid labour has also been included. The other major items of current expenses are taxes, trucking, threshing and other hired machine work, fertilizer, seed and feed.

Capital expenditures include outlays for new land, buildings, machinery and livestock. These items averaged a total of $573 per farm for the entire area. Inventory decreases have been included as farm expenses in the same way that inventory increases were considered as farm receipts. These items represent largely depreciation on buildings and equipment.

Total farm expenses, including current expenses, capital expenditures and inventory decreases amounted to $2,215 on the average for all farms. Total expenses were highest in the Chatham area, at $2,450 per farm, and lowest in the Wallaceburg area at $1,854 per farm.

Subtracting total farm expenses from total farm receipts gave an average farm income of $882 per farm for the entire area. When interest on investment at 4 per cent is deducted from farm income, the remainder called labour income averaged $456 per farm. This figure represents the return to the farmer for his labour after allowing depreciation, interest and all other costs. In addition to his labour income a farmer also receives a considerable amount of his living from the farm. The value of such items as milk, eggs, meat and garden produce were estimated by the farmers and have been added to labour income. An allowance for the use of the dwelling has also been made. This allowance represents 10 per cent of the value of the house and tends to affect charges of depreciation, interest and repairs which had previously been included in farm costs. The net result after adding these items of living from the farm and use of dwelling has been called labour earnings and averaged $790 per farm. The highest labour earnings were secured in the Chatham area, averaging $1,098 per farm while the lowest was $449 per farm in the Sarnia area. It may be pointed out that in the calculation made to arrive at the figure of labour earnings there were several items included as expenses which, though legitimate charges against revenues, may not have been paid out in cash; the amounts so charged may be available for living or other expenses. These items include interest on the operator's capital, wages for family labour and depreciation on land, buildings, equipment and livestock. It will be recognized, however, that where the operator is forced to draw upon these resources to maintain his current position he has actually been depreciating his capital and human resources.

Table 17. Financial Summary per Farm, 140 Farms in Lambton, Kent and Essex Counties in 1938-39.

Farms Sorted on Basis of Areas

	Areas					
	Sarnia	Tilbury	Chatham	Sombra	Wallace-	All farms
	29 farms	33 farms	23 farms	24 farms	31 farms	140 farms
Crop sales	1,298	1,083	1,800	935	1,497	1,311
Livestock sales	605	621	1,056	849	1,014	815
Livestock product sales	666	281	233	309	228	346
Miscellaneous farm receipts	143	82	109	55	159	112
Equipment sales	83	30	15	37	55	45
Total cash receipts	2,795	2,097	3,213	2,185	2,953	2,629
Inventory increase						
Real estate	12	189	42	255	45	108
Livestock	160	72	217	148	134	140
Machinery & equipment	131	77	125	112	160	121
Feed & supplies	42	63	138	134	133	99
Total inventory increase	345	401	522	649	472	468
Total farm receipts	3,140	2,498	3,735	2,834	3,425	3,097
Total current expenses	1,678	1,269	1,665	1,048	1,612	1,457
Livestock purchased	206	78	306	122	195	175
New machines & equipment	311	200	222	239	342	265
New bldgs., land & improvements	24	218	74	306	54	133
Total capital expenses	541	496	602	667	591	573
Inventory decrease						
Real estate	80	55	53	51	77	64
Livestock	8	71	34	40	63	45
Machinery & equipment	73	68	91	48	76	71
Feed & supplies	13	7	5			5
Total inventory decrease	174	201	183	139	216	185
Total farm expenses	2,393	1,966	2,450	1,854	2,419	2,215
Farm income	747	532	1,285	980	1,006	882
Interest	407	376	530	395	445	426
Labour income	340	156	755	585	561	456
Perquisites						
Livestock	129	125	133	185	135	140
Fruits & vegetables	34	18	28	33	33	29
Miscellaneous	4	-	-	17	-	5
Use of dwelling	155	150	173	168	168	161
Total perquisites	322	293	334	403	336	334
Labour earnings	662	449	1,089	988	897	790

Cash Income

Previous calculations show the earnings of the operator after all cash and non-cash items of receipts and expenses had been taken into account. It is also of interest to calculate as closely as possible the net cash income of the operator during the year. This is presented in table 18.

Table 18. Net Cash Income and Capital Expenditures per Farm, 140 Farms, Lambton, Kent and Essex. 1938-39

	Chatham	Wallaceburg	Sombra	Sarnia	Tilbury	All farms
	$	$	$	$	$	$
Cash Receipts	3,213	2,953	2,185	2,795	2,097	2,629
Cash Operating Expense(1)	1,542	1,391	855	1,447	1,007	1,242
Net Cash Income	1,671	1,562	1,330	1,348	1,090	1,387
Capital Expenditures	602	591	667	541	496	573
Net Cash Available	1,069	971	663	807	594	814

(1) Operating expenses less value of unpaid labour.

In the determination of net cash income, the non-cash items of expense such as the value of unpaid family labour, interest on capital and depreciation on buildings and equipment have not been included in expenses. If the farmer has been obliged to draw on these resources to maintain his current position he has actually been depreciating his capital and human resources. If these non-cash costs are met over a period of years, all the capital of the farm would be used up. The capital expenditures made during the year studied have all been shown in the above table. This amount averaged $573 per farm and includes such items as new buildings, new equipment and livestock purchases. It is difficult to estimate how much of these capital expenditures would be necessary in any given year. During years of low income capital expenditures would be reduced to a minimum, but such expenditures would have to be met after a few years if the capital resources of the farm are to be maintained.

Factors Affecting Financial Success

If farm income is used as the measure of financial success it will be seen from the above discussion of expenses and receipts that the highest family income will be achieved from securing the greatest gross returns in relation to expenses.

Gross returns on the farms studied were made up from the sale of a wide variety of crops, livestock and other products. The total value of these sales is the result of the physical amounts sold at the prices received. Therefore gross returns were increased either by securing higher production, securing increased prices, or selling more high priced products and less low priced products. It is obvious that all farmers cannot devote all their acreage or time to the production of the one most remunerative crop or class of livestock. Each individual farmer will have to organize his farm in such a way as to take the fullest advantage of his land, his capital, his labour and his other productive resources. Only a relatively few farms have soil and other facilities suitable for the production of tabacco, or markets suitable for the sale of fluid milk.

The only way to finally test the advisability of following any one farm enterprise is to test its returns against those of other enterprises or by observing the results achieved by other farmers in the community Increases in output of product can be achieved by such recognized good farming practices as the use of suitable varieties, rotation of crops, proper fertilization and more intensive cultivation. In all cases, however, it is necessary to make sure that the increased costs involved are not out of proportion to the increased output.

The price of the product sold is often beyond the control of the individual farm operator. However, advantage can be taken of price differenc arising out of better quality, selling at the most advantageous time of year and through co-operative effort on the part of producers.

The other factor of cost must also always be borne in mind by the successful farm operator. Total farm expenses are again the result of two factors, the amount purchased and the price paid. We have seen from our discussion of farm expenses that labour was the most important farm cost in this area from the standpoint of amount paid out. A study of rates of wages paid to labour shows that year help is the least expensive and day help the most expensive form of labour. This would indicate that if the farm business can be so organized as to keep one man employed for a year, it would be more economical than to hire a number of men for short periods of rush activity. This same argument also applies to the labour of the operator and his family. A type of farm organization which provides full employmnet for the family labour for 12 months will generally be more satisfactory than one that meets this requirement for only short periods during the year.

The relatively high land taxation per acre in the area studied, associated with high land values, is one of the contributing factors to the necessity of growing high income crops. Feed expenses in the area would vary considerably with crop conditions and feed prices. Many farmers find it profitable to purchase at least some feeds as they can employ their land more satisfactorily in the production of other cash crops. Many good farmers consider that feeding livestock on purchased feed provides added fertilizer at a relatively low cost. The relatively high annual expense for commercial fertilizer might be reduced in some cases, but it is doubtful if the expense is often carried beyond the point where added returns do not justify the additional cost. In the case of the minor expense items, as with the more important ones, it is essential that care be taken to make sure that the expense items are offset by some definite contribution to the farm income.

No definite or positive formula for successful farm operation can be set up as a model in any area. This is because of the differences which exist between individual farmers themselves and the farms which they operate. Even in a relatively small area the soils may be subject to wide variations and hence are most adaptable to different crops. Market conditions may influence the choice of enterprises as between farms and many other factors will influence the type of farming carried on. However, despite these differences, certain principles can be seen from a study of this nature which seems to be associated with the most satisfactory results. These factors are discussed in succeeding paragraphs.

Size of Business

In order to determine the relation between size of business and earnings, the farmers were sorted on the basis of size. The size of business was measured by total productive man work units. This total was arrived at by calculating the number of ten-hour days work necessary to accomplish the work of growing the crops and caring for the livestock on individual farms A work standard was used to estimate the work requirements for each crop and class of livestock based on average efficiency. This measure of size of business is most adaptable to types of farming where both crops and livestock are important enterprises. Other measures,such as acres of land, acres of crops, and numbers of livestock are only applicable to more specialized farming areas.

In this grouping of the farms the records were divided into four classes: those having under 350 productive man work units; those from 350 to 499 days; those from 500 to 649 days and those over 650 days. Since one man working full time would accomplish approximately 300 days of productive work it will be seen that the smallest group of farms could be classed as "one man" farms, while the largest group would have a labour force of something over two men per farm.

The calculations shown in Table 19 show that as the size of business increased there was a corresponding increase in labour earnings. The average labour earnings of the small farms amounted to $569 per farm compared with an average of $1,165 for the larger farms. These figures show clearly the relation of size of business to farm earnings, increase in the size of business,as measured by days of labour,may be associated by any one of another number of othermeasures of size. The total area of the farm or the crop acres may be larger; the numbers of livestock maintained may be greater; the crops grown may be such that they require larger amounts of labour; the buildings may be more extensive. Thus size of business cannot always be ascertained without a complete study of the business. A farm with a small acreage, but which has all its area devoted to highly intensive crops may in reality be a larger business than a farm with a large number of acres which are largely in pasture and hay crops. Thus a size of business which will yield a satisfactory return to the operator and his family may be accomplished without the necessity of buying more land, live stock or equipment but rather from a more intensive use of the factors of production which are available.

While size of business has been shown in this study to have been closely related to family income, it nevertheless must be be borne in mind that size alone is not a guarantee of success. A farm may be well above average in size, measured either by acres, number of livestock, labour or any other measure, but unless the farm is organized and managed properly, success will not be assured. However, it is true that unless the farm business is of adequate size no amount of good management can achieve more than limited success.

Table 19. Financial Summary per Farm, 140 Farms in Lambton, Kent and Essex Counties in 1938-39.

Farms Sorted on Basis of Total Productive Man Work Unit.

	Total Number of Productive Man Work Units:				All farms
	0-349.9	350-499.9	500-649.9	650 & over	
	(33 farms)	(49 farms)	(22 farms)	(36 farms)	(140 farms)
Crop sales	687	1,026	1,494	2,160	1,311
Livestock sales	443	592	966	1,369	815
Livestock product sales	213	266	490	488	346
Miscellaneous farm receipts	15	85	39	280	112
Equipment sales	28	42	51	63	45
Total cash receipts	1,386	2,011	3,041	4,360	2,629
Inventory increase					
Real estate	29	182	37	123	108
Livestock	97	113	142	217	140
Machinery & equipment	115	93	88	183	121
Feed & supplies	57	72	126	157	99
Total inventory increase	298	460	393	680	468
Total farm receipts	1,684	2,470	3,434	5,040	3,097
Total current expenses	686	1,176	1,656	2,443	1,457
Livestock purchased	99	78	199	363	175
New machines & equipment	188	213	262	406	265
New bldgs., land & improvements	43	214	64	148	133
Total capital expenses	330	506	525	917	573
Inventory decrease					
Real estate	58	46	62	95	64
Livestock	34	43	42	59	45
Machinery & equipment	34	58	81	116	71
Feed & supplies	1	1	8	13	5
Total inventory decrease	128	148	194	283	185
Total farm expenses	1,123	1,830	2,375	3,642	2,215
Farm income	561	640	1,060	1,397	882
Interest	241	378	484	627	426
Labour income	320	261	576	771	456
Perquisites					
Livestock	94	147	149	165	140
Fruits & vegetables	25	29	30	31	29
Miscellaneous	3	11	—	1	5
Use of dwelling	126	147	186	197	161
Total Perquisites	249	333	366	394	334
Labour earnings	569	595	941	1,165	790

Relation of Crop Yields to Earnings

In an area where crop production is as important as it is in this section of Ontario, the yield per acre produced is of special importance. In order to measure the crop yields for all crops grown on the farms a crop index for each farm was calculated. The method of calculation was based on the average yield in the community for each crop. The index was weighted by the acreage of each crop grown. If a farmer had average yields for each of the crops grown his crop index would be 100. The range in crop index on individual farms was from a low of 52.3 to a high of 154.2. The variation between farms was the result of basic differences in soil conditions and differences in farm practices on the individual farms.

The farms included in the study were grouped into four classes according to the crop index achieved. These groups ranged from those below 90 to those above 110. The labour earnings of the low crop yielding group averaged $529 per farm compared with an average of $1,155 for those farms having an index of over 110. While these differences in earnings cannot all be attributed to the differences in crop index it was demonstrated that there was not a great deal of difference in the size of farm as measured by total productive man work units and the acres in crop were smaller by 13 acres per farm for the high yielding group compared with the low yielding group.

Table 20. Relation of Crop Index to Labour Earnings per Farm.

Crop Index	No. of farms	Labour Earnings $	Total Productive Man Work Units	Acres in crop
Under 90	44	529	520	92.3
90 - 99.9	23	589	492	94.0
100 - 109.9	28	764	451	81.7
110	45	1,155	534	79.2
All farms	140	790	507	86.2

Specialization in Sugar Beets

In an effort to determine the relative importance of the sugar beet crop and its effect on earnings the farms were sorted on the basis of the percentage of productive man work units which were devoted to sugar beet production. The records were separated into four groups: 0 - 12.9 per cent ; 13 - 18.9 per cent; 19 - 24.9 per cent;and over 25 per cent of the time being spent on beets. Although those farms which had over 25 per cent of their labour devoted to sugar beets did have somewhat higher earnings than those farms with less than 12.9 per cent on beets the results were not conclusive. The same uncertainty existed when the percentage of crop acres devoted to sugar beets was used as a measure of specialization.

This analysis indicates that the sugar beet crop is a profitable farm enterprise in the area but there are also other enterprises which are equally profitable. Thus when the sugar beet enterprise is expanded other enterprises must be correspondingly curtailed and the net results are not changed to any marked degree.

Table 21. Relation of Specialization in Sugar Beet Production to Labour Earnings, Lambton, Kent & Essex Counties. 1938-39

Per cent of work units on beets	Number of farms	Labour Earnings
		$
0 - 12.9	41	652
13 - 18.9	41	901
19 - 24.9	25	698
25 and over	33	892
All Farms	140	790

Acres of Sugar Beets

In order to further study the importance of the sugar beet crop as a factor in farm success the farms were first sorted into groups according to acres of crop land. The farms in each individual size groups were then sorted into two groups according to the acreage of sugar beets. In this way the factor of size, as measured by crop acres, was held constant and the net effect of the sugar beet crop is more clearly shown. The results of this tabulation are shown in table 22.

It will be seen that in all but the first group the results were more satisfactory when the acreage of sugar beets was relatively high. In the first group the higher farm income secured by the farmers with low acreages of sugar beets are attributable to the fact that receipts from sources other than crops were considerably higher on those farms than on the farms with larger acreages of beets. Included in this group were two farms with large scale poultry enter prises. In the other three groups the farms with relatively high acreages of sugar beets had substantially higher farm incomes than those farms with low acreages of augar beets. It would not be safe to conclude that all of this difference was due to the greater production of beets. However, it is true that most of the increased receipts were due to a larger volume of crop sales and in each case the increased sales of beets was an important contributing factor. In the group of farms having more than 105 acres almost the entire difference in cash receipts was due to increased sales of beets. Therefore, even though consideration must be given to other factors, including farm expenses, the relation of increased sales of beets to total farm receipts is significant.

Table 22. Relation of Sugar Beet Acreage to Income

		Acres of Cropland							
		Under 54 9		55.0-79.9		80.0-104.9		105+	
		Acres Beets							
		Up to 6.0 acres	Over 6.0 acres	Up to 7.5 acres	Over 7.5 acres	Up to 8.0 acres	Over 8.0 acres	Up to 10.0 acres	Over 10.0 acres
Number of farms		17	16	18	19	14	16	18	21
Acres crops		37.1	45.1	67.7	68.0	95.7	83.2	132.5	144.8
Acres beets		3.9	9.9	5.1	12.5	5.9	13.5	7.2	18.3
Beet sales	$	285	678	337	814	415	931	465	1,377
Total farm receipts	$	2,268	2,082	2,081	2,952	2,995	3,101	3,984	4,853
Total farm expenses	$	1,487	1,544	1,509	2,159	2,337	1,990	2,828	3,532
Farm income	$	781	538	572	793	658	1,111	1,056	1,321

High and Low Income Farms

Another method of studying the reasons behind differences in the success of farm operators is by comparing the records of those farmers who were most successful with those of the farmers whose family incomes were lowest. The average labour earnings of the 25 most successful farm families was $1,876 for the year studied compared with an average loss of $87 per farm for the 25 least successful.

In so far as farm organization was concerned an analysis of the 25 most successful farms shows that 14 of these farms received the largest proportion of their income from the sale of crops. Five of the farmers were specializing in beef cattle and hog production. Three were dairy farmers. The other three were more diversified with income divided among crop sales, livestock and livestock products. The poultry enterprise was relatively important on two of these latter three farms. This divergence in source of income demonstrates the fact that even in a relatively small area, with climatic and other conditions similar, the type of farm organization which results in successful financial returns may be very different.

From the standpoint of size the more successful farms were larger. Requirements amounted to an average of 691 days on these farms compared with 470 days on the less successful farms. In acreage the better farms had 114 acres of cropland compared with 88 acres for the other group. Livestock numbers were also greater as was total farm capital. These facts further emphasize the importance of building up sufficient volume of business to achieve success financially.

Measure of efficiency such as crop yields, returns from livestock per animal, days of work per man and volume of sales in relation to capital, all indicated greater efficiency on the more successful farms.

Acres of sugar beets were higher, averaging 14.3 acres per farm on the more successful farms as against 8.2 acres for the lower group. In addition the acreage of other high income crops such as beans, tomatoes and tobacco were greater on these farms.

Table 23. Important Factors on 25 Most Successful and 25 Least Successful Farms, Lambton, Kent and Essex Counties. 1938-39.

		25 Most Successful	25 Least Successful
Total cash receipts	$	4,611	2,035
Total farm receipts	$	5,380	2,324
Operating expenses	$	2,149	1,582
Total farm expenses	$	3,307	2,281
Farm income	$	2,073	43
Labour earnings	$	1,886	- 87
Total work units		691	470
Average capital	$	14,487	11,093
Acres sugar beets		14	8
Area cash crop	ac.	68	50
Area feed crops	ac.	46	38
Total crop acres		114	88
Total animal units		19	12
Labour expenses	$	845	582
Fertilizer expenses	$	129	85

Cost of Producing Sugar Beets

The problem of computing the costs of production of any farm product which is produced on the same farm and in combination with other enterprises is a difficult one. Many of the costs incurred on the farm, such as taxes, machinery and building overhead, and similar items, are joint costs. In this study an attempt has been made to allocate those costs in such a way that the burden placed on the sugar beet crop was fair and reasonable. A detailed statement of the methods used in computing costs is given in the appendix. It is also necessary to point out that costs computed for any one year are representative only of that year and that weather and other conditions may cause considerable variation in the cost of producing any one crop over a period of years. The costs on different farms are also subject to variation because of different methods of production and different conditions existing on the individual farms.

In interpreting the itemized cost statements which will appear in succeeding tables the reader will realize that all the individual items of cost are not incurred on all farms and when the averages are taken for the individual items, they represent the average of all farms rather than the average of those farms which incurred the particular item of expense. For example the wages paid for contract labour,(blocking, hoeing and topping) were in almost all cases $17.00 per acre for the three operations. However, not all farmers hired this work done, consequently the average charge for contract labour on all farms was $13.51 per acre. Where farmers and their families did this labour themselves the charge for this work was included in the charge for man labour, along with other man labour such as cultivating, plowing and tillage work.

The average cost of producing an acre of sugar beets as computed by the methods outlined in the appendix was $53.78 per acre, table 24. The major items of expense were: contract labour $13.51 per acre; man labour $6.89 per acre; horse labour $8.27 per acre; land use $6.05; manure $7.55 per acre and fertilizer $3.19 per acre. The total man labour charge, including contract labour and farm labour, amounted to $20.40 per acre. The total fertilization charge, including manure, green manure, lime and commercial fertilizer was $10.58 per acre. The total charge for use of machinery averaged $2.47 per acre

There was a considerable variation in the cost of producing sugar beets between the various areas into which the survey was divided. The lowest costs were reported in the Sarnia area at $48.45 per acre, while the highest costs $59.80 per acre, were found in the Chatham area. The difference in cost as between these two areas was largely due to lower contract labour charges, lower manure charges and a lower charge for land use in the Sarnia area. The yield per acre and total returns, however, were sufficiently higher in the Chatham area to offset the higher costs, so that net returns per acre were somewhat higher in that area than in the Sarnia area which had the low costs. Costs in the Tilbury Area were also low, but the low yield per acre secured in this area resulted in net returns lower than those obtained in any other area.

Variations in farm practices can be seen from an analysis of the variations in cost items. The man labour charge in the Sombra area was higher than in any other area but this was offset by lower contract labour charges. This indicates that farmers in this area tended to do more of their own work on the sugar beet crop than was the case in the other districts. The manure

Table 24. Cost of Production and Net Returns from Sugar Beets, 204 Farms in Essex, Kent and Lambton Counties, 1938-39

	Chatham	Wallaceburg	Sombra	Sarnia	Tilbury	All Farms
No. of farms	49	47	27	31	50	204
Ac. planted per farm	11.2	11.8	8.3	10.8	9.9	10.6
Yield per acre	11.7	10.9	10.8	10.8	8.2	10.4
tot. rec. from beets	79.17	71.35	73.36	66.83	53.51	68.70
Other credits	2.50	1.93	2.73	1.62	1.14	1.93
Total returns	81.67	73.28	76.09	68.45	54.65	70.63
Cost Items						
Man labour	5.98	5.86	10.47	7.57	6.98	6.89
Contract labour	15.34	16.37	9.90	11.48	11.30	13.51
Horse labour	6.24	6.64	7.41	6.01	5.58	6.27
Tractor use	1.16	.81	.95	.44	1.14	.92
Truck use	.11	.19		.34		.13
Auto use	.02		.02		.01	.01
Hired trucking	4.67	3.46	4.72	2.11	4.75	3.93
Seed	2.13	2.04	2.17	1.94	2.13	2.08
Lime and salt	.02		.08			.01
Manure	10 18	7.22	4.46	6.22	6.26	7.33
Green manure	.05	.01	.08	.02	.23	.05
Fertilizer	3.38	3.56	3.09	3.28	2.51	3.19
Beet machinery	1.82	1.65	1.77	1.02	1.39	1.55
General machinery	.62	.74	.75	.89	.51	.69
Hired machinery	.16	.24	.16	.30	.28	.23
Interest	.63	.66	.46	.99	.48	.56
Land use	7.07	6.51	5.03	5.24	5.10	6.05
Other	.22	.54	.05	.60	.16	.33
Tot. costs per acre	59.80	56.50	51.59	48.45	48.81	53.78
Net returns per acre	21.87	16.78	24.50	20.00	5.84	16.85

charge was also subject to considerable variation. The highest average cost per acre for this item was in the Chatham area. The charge for commercial fertilizer was quite similar in all areas indicating a relatively uniform application of this fertilizer. The land charge was highest in the Chatham area, reflecting higher land values in this area and higher taxes per acre

In this study farm labour was charged to the best enterprise at the regular rate paid hired farm help which amounted to 15 cents per hour. This charge for man labour represents a return for labour only and no allowance is made for management. It is shown in the appendix that 20 cents per hour represents a return to labour and management, comparable to what was actually earned on these farms in 1938-39. If man labour is charged to the best enterprise at 20 cents per hour the total cost of growing sugar beets would be raised from $53.78 to $56.07 per acre. The net returns would be reduced from $16.85 to $14,56

The number of farms and tons of beets produced at varying costs is shown in table 25. There were 22,586 tons of sugar beets produced on the farms included in the study. The average cost of producing sugar beets was $53.78 per acre. Approximately one half of the total production was produced below the average cost, 58 per cent being produced at less than $55.00 per acre. Costs per acre were below $55.00 on 114 of the 204 farms. Three and one half per cent of the beets were produced at a cost of less than $55.00 per acre.

Cost according to Acres of Sugar Beets

The farms were sorted into groups according to the acreages of sugar beets and the costs tabulated for the different size groups,table 26. One would expect that as the acreage of sugar beets increased the costs per acre

Table 25. Production of Sugar Beets at Varying Costs per Acre, Essex, Kent and Lambton Counties, Ontario. 1938-39.

Cost per acre	Number of farms	Production of sugar beets		Cumulative production of sugar beets	
		Tons	%	Tons	%
Under $35.00	5	687.00	3.5	687.00	3.5
$35.00 - $39.99	15	1,081.70	6.7	1,748.70	10.2
$40.00 - $44.99	21	2,698.87	12.5	4,445.57	22.7
$45.00 - $49.99	33	3,876.24	16.9	8,321.81	39.6
$50.00 - $54.99	40	4,516.89	18.8	12,838.70	58.4
$55.00 - $59.99	28	3,251.92	14.6	16,090.62	73.0
$60.00 - $64.99	21	2,293.53	10.0	16,384.15	83.0
$65.00 - $69.99	15	1,762.69	7.2	20,146.84	90.2
$70.00 - $74.99	15	1,485.46	5.9	21,632.30	96.1
$75.00 - $79.99	7	556.98	2.3	22,189.28	98.4
$80.00 and over	4	396.50	1.6	22,585.78	100.0
All Farms	204	22,585.78	100.0	22,585.78	100.0

would be reduced by the economy of larger scale production. However, the results do not show any marked lowering of costs per acre until the acreage exceeded 20 acres of sugar beets. The costs per acre in the first three groups, 0-4.9 acres; 5 to 9.9 and 10 to 14.9 acres, were all close to $55.00 per acre. Costs for the group 15 to 19.9 acres actually averaged higher, at $58.07 per acre, than for the previous three groups. The group of farms having 20 to 24.9 acres of beets had lower costs at $51.28 per acre and the group having over 25 acres of beets had costs averaging $48.85 per acre. When the acres of sugar beets exceeded 20 there was a tendency towards increased efficiency in the use of machinery. The total charge for the use of machinery was $3.85 on the farms with less than 5 acres of beets; $2.05 on the farms having 20.0 to 24.9 acres and $1.36 on the farms with more than 25.0 acres of beets. The charge per acre for horse labour decreased as the acres of sugar beets per farm increased. The charge for the use of a tractor became greater as the acres in beets per farm increased but the total cost of field power, horse and tractor use together, declined with an increase in the beet acreage indicating increased efficiency where large acreages of beets were grown per farm. Such cost items as man labour, seed, fertilizer, and manure did not show any definite tendency to decline with increased acreage of beets.

Net returns per acre averaged highest for the group with 0-4.9 acres of beets. Although costs were above average for this group of farms the yield per acre and consequent gross receipts per acre were sufficiently high to provide the highest net returns.

Table 26.- Relation of Acreage in Beets to Cost of Production and Net Returns, 204 Farms in Essex, Kent and Lambton Counties, Ontario, 1938-39.

		Acres of Sugar Beets					
	0 - 4.9	5.0 - 9.9	10.0 - 14.9	15.0 - 19.9	20.0 - 24.9	25.0 & over	All Farms
No. of farms	42	75	49	14	12	12	204
Acres planted per farm	3.7	7.0	11.6	17.4	21.3	31.8	10.6
Yield per acre	10.7	10.4	10.7	10.3	10.0	10.1	10.4
Total beet receipts $	72.26	68.56	71.29	68.43	69.07	63.91	68.70
Other credits	2.01	1.96	2.28	2.34	1.42	1.45	1.93
Total returns from beets $	74.27	70.52	73.57	70.77	70.49	65.36	70.63
Cost items							
Man labour	9.84	8.68	7.02	6.17	4.40	5.28	6.89
Contract labour	9.59	12.10	13.61	15.99	15.68	13.86	13.51
Horse labour	7.80	7.90	6.46	6.04	4.50	4.63	6.27
Tractor use	.36	.67	.93	1.21	1.36	1.04	.92
Truck use		.04	.09	.23	.14	.27	.13
Auto use	.01	.02	.01	.01	.01		.01
Hired trucking	5.97	3.45	3.33	4.35	5.22	3.38	3.98
Seed	2.00	2.04	2.14	2.09	2.11	2.07	2.08
Lime and salt	.03		.03				.01
Manure	5.76	7.71	8.53	8.11	4.70	6.88	7.33
Green manure	.08	.05	.02		.13	.06	.05
Fertilizer	3.13	3.25	3.12	3.60	3.28	2.94	3.19
Beet machinery	2.72	1.94	1.61	1.26	1.34	.83	1.55
General machinery	.71	.80	.76	.66	.63	.47	.69
Hired machinery	.42	.51	.26	.33	.08	.06	.23
Interest	.44	.52	.57	.65	.63	.56	.56
Land use	5.45	5.88	5.88	6.39	6.42	6.30	6.05
Other	.07	.20	.18	.98	.65	.22	.33
Total cost per acre	54.38	55.56	54.55	58.07	51.28	48.85	53.78
Net returns per acre	19.89	14.96	18.72	12.70	19.21	16.51	16.85

Relation of Varying Amounts of Contract Labour

Many farmers in the area contract all hand labour for blocking, hoeing and topping the sugar beets grown on their farms while others perform these field operations with regular farm labour. In order to compare the costs and returns from growing sugar beets when the hand labour was contracted as compared with the cases where no labour was contracted the 204 beet cost records were divided into three groups; those with all the hand labour contracted (113 farms), those where the hand labour was partially contracted (51 farms), and those where none of it was contracted (40 farms).

The average total cost of producing beets on the farms where all the hand labour was done by the farm labour was $45.00 per acre, table 27. Where all the hand labour was done by contract labour the total costs averaged $56.60. The difference in total costs was almost entirely due to the higher labour charge on the farms hiring contract labour. This higher charge is accounted for by the fact that contract labourers are paid at rates substantially higher than regular hired labour. The rate which was used in computing the labour charge, where the labour was done by the farmer and his family, was that of regular hired help.

It will be observed that the acres of sugar beets per farm were higher on those farms where all hand labour was contracted. Moreover, the yeild per acre was higher on those farms which partially offset the higher costs.

Influence of Yield on Cost

The 204 cost records were sorted on the basis of yield per acre in order to show the influence of yield on the cost of growing sugar beets per

Table 27. Relation of Varying Amounts of Contract Labour to Costs of Production and Net Returns from Sugar Beets per Acre on 204 Farms in Essex, Kent and Lambton Counties, Ontario, 1938-39

	Hand labour			
	All contracted	Partially contracted	None contracted	All farms
No. of farms	113	51	40	204
Acres planted per farm	12.2	9.7	7.2	10.6
Yield per acre	10.9	9.5	10.1	10.4
Total beet receipts $	71.51	63.02	66.06	68.70
Other credits	1.94	1.82	2.02	1.93
Total returns	73.25	64.84	68.08	70.63
Cost Items				
Man labour	5.07	8.06	13.51	6.89
Contract labour	17.19	11.17		13.51
Other costs	34.34	31.26	32.49	33.38
Total costs per acre	56.60	50.49	46.00	53.78
Net returns per acre	16.65	14.35	22.08	16.85

acre. It is indicated in table 28 that as the yield increased from less than 9.0 tons to more than 12.0 per acre the cost per acre became greater but the cost per ton decreased from $6.78 in the low yielding group to $4.34 on those farms where the yield was 12 tons or more. The higher costs per acre incurred on those farms where the higher yields were secured resulted from higher charges for manure, commercial fertilizer, land use and labour.

Net returns per acre, after deducting costs, were substantially higher for the group of farms which secured the higher yields per acre of beets, being $32.06 per acre for the high yielding group compared with $1.69 for the low yielding farms.

Percentage of Tonnage Produced at Varying Costs

When the farms were grouped according to the cost per ton of beets produced it was shown that the range in costs per ton varied from $3.00 per ton to over $8.00 per ton, table 29. Although only a small percentage of the beets were produced at costs less than $3.00 per ton it was shown in the cumulative totals that 54.4 per cent of the tonnage was produced at a cost of less than $5.00 per ton. There was 79.6 per cent of the tonnage produced at less than $6.00 per ton and 91.0 per cent at less than $7.00 per ton. Beets were being produced at less than $5.00 per ton on 98 of the 204 farms included in the study. On 151 farms the cost was less than $6.00 per ton and on 175 farms costs were less than $7.00 per ton. The relatively high costs incurred on the remaining 29 farms were largely due to yields per acre which averaged only 7.2 tons compared with 10.4 tons per acre for the entire study. These low

Table 28. Influence of Yield per Acre on the Cost and Returns from Sugar Beets, 204 Farms in Essex, Kent and Lambton Counties, Ontario. 1938-39..

		Tons per acre		
	Less than 9.0	9.0 - 11.9	12.0 & over	All farms
No. of farms	45	101	58	204
Acres planted per farm	9.3	11.8	9.6	10.6
Yield per acre	7.1	10.4	13.2	10.4
Total beet receipts	$ 48.60	67.43	86.54	68.70
Other credits	1.38	1.78	2.64	1.93
Total returns	49.98	69.21	89.18	70.63
Cost Items				
Manure	5.82	7.31	8.45	8.33
Fertilizer	2.72	3.26	3.59	3.19
Land use	4.99	6.21	6.51	6.05
Other	34.76	37.36	38.77	37.21
Total costs per acre	48.29	54.14	57.12	53.78
Net returns per acre	1.69	15.07	32.06	16.85
Cost per ton	6.78	5.22	4.34	5.14

Table 29. Tonnage and Percentage of Sugar Beets Produced at Varying Costs per Ton, Essex, Kent and Lambton Counties, Ontario. 1938-39.

Cost per ton	Number of farms	Total production		Cumulative production	
		Tons produced	Per cent tonnage	Tons	%
3.00 - 3.49	5	591.00	2.6	591.00	2.6
3.50 - 3.99	22	3,791.06	16.8	4,382.06	19.4
4.00 - 4.99	36	4,265.42	18.9	8,647.48	38.3
4.50 - 4.99	35	3,640.53	16.1	12,288.01	54.4
5.00 - 5.49	23	2,554.00	11.3	14,842.01	65.7
5.50 - 5.99	30	3,150.39	13.9	17,992.40	79.6
6.00 - 6.49	15	1,882,68	8,3	19,875.08	87.9
6.50 - 699	9	689.46	3.1	20,564.54	91.0
7.00 - 7.49	5	351.94	1.6	20,916.48	92.6
7.50 - 7.99	11	801.00	3.6	21,717.48	96.2
8.00 & over	13	868.30	3.8	22,585.78	100.0
Total	204	22,585.78	100.0	22, 585.78	100.0

yields resulted, in part, from disease and insect pests.

Net Returns and Cost per Acre

It has been shown in previous tables relating to costs and returns that the highest net returns were not necessarily secured on those farms with the lowest costs. In other words, it appeared that as costs increased yield per acre and total returns also increased. In order to determine where net returns were highest the records were sorted on the basis of costs per acre. As shown in table 30 the yield per acre, total beet receipts and total returns all increased as costs increased. Net returns were highest for the group of farms with costs ranging from $40.00 -$49.99 per acre. When costs were over $50.00 per acre net returns decreased, although they were higher for the cost group of $50.00 - $59.99 than for the group with costs below $40.00 per acre.

The farms reporting low costs of production per acre had lower charges for almost all items of cost except man labour. This was more than offset, however, by low cost of contract labour per farm. In the low cost group total labour costs, man labour and contract labour, made up 49.4 per cent of the total costs. This percentage declined as total cost increased and for the group with costs of over $70.00 per acre the labour charge was 31.5 per cent of the total.

One of the most important items of cost which increased more than proportionately from group to group was that of manure. Manure charges were only 5.4 per cent of the total costs for the low cost group whereas they account for 26,8 per cent of the total cost on the high cost farms. It appears that

Table 30. Cost of Production and Returns from Sugar Beets per Acre on 204 Farms in Essex, Kent and Lambton Counties, Ontario, 1938-39.

	Cost per Acre					
	Under $40.00	$40.00 - $49.99	$50.00 - $59.99	$60.00 - $69.99	Over $70.00	All farms
No. of Farms	20	54	68	36	26	204
Acres of beets	11.0	11.8	10.6	10.3	8.1	10.6
Yield clean beets	7.9	10.3	10.8	10.9	11.6	10.4
Total beet receipts $	51.30	66.44	71.36	72.06	78.68	68.70
Other credits	1.44	1.78	1.97	2.39	1.96	1.93
Total returns	52.74	68.22	73.33	74.45	80.64	70.63
Cost Items						
Man labour	9.64	6.87	5.55	8.02	6.67	6.89
Contract labour	4.03	13.12	15.52	13.96	16.93	13.51
Horse labour	5.76	5.77	6.06	7.23	7.36	6.27
Tractor work	.44	.99	.85	.76	1.84	.92
Hired trucking	2.39	2.25	4.91	5.67	4.72	3.98
Seed	2.06	2.13	2.03	2.04	2.19	2.08
Manure	1.96	2.84	5.96	13.54	20.12	7.33
Fertilizer	2.70	2.96	3.49	3.13	3.41	3.19
Machinery, beet	1.11	1.23	1.69	1.50	2.59	1.55
Machinery, general	.58	.63	.73	.67	.83	.69
Machinery, hired	.34	.24	.18	.19	.33	.23
Interest	.26	.55	.63	.57	.68	.56
Land use	4.76	5.56	6.60	6.28	6.64	6.05
Other	.14	.48	.34	.81	.55	.53
Total costs	36.17	45.62	54.74	64.37	74.86	53.78
Net returns	16.57	22.60	18.59	7.13	5.78	16.85

while the use of barnyard manure adds materially to the yield per acre of sugar beets there is a point beyond which the additional use of fertilizer costs more than the increased yield returns to the grower.

Cash Costs of Production

The costs of producing beets were divided as nearly as possible between these costs which were definitely paid out in cash and those which were non-cash, table 31. The cash items included contract labour, hired trucking, hired machinery, cash operating costs of tractor, truck and auto, seed, commercial fertilizer, machinery repairs, paid interest charges, cash rent and taxes. These costs averaged $26.62 per acre for the entire area, ranging from a low of $22.30 per acre in the Sarnia area to a high of #30.10 per acre in the Wallaceburg area. Cash costs for the entire area were 49.5 per cent of total costs.

The non-cash items of cost include farm labour, horse labour, manure, over head on equipment and part of the interest and land charges. While it is possible to produce beets in any one year at a cost which does not include these non-cash items of cost, nevertheless if the industry is to continue on a permanent basis all such costs must be met.

Table 31. Cash Costs in Sugar Beet Production on 204 Farms, Essex, Kent and Lambton Counties, Ontario. 1938-39.

District	No. of farms	Cash costs per acre	All costs per acre	Percentage cash costs are of all costs
		$	$	%
Chatham	49	29.51	59.80	49.3
Wallaceburg	47	30.10	56.50	53.3
Sombra	27	22.87	51.59	44.5
Sarnia	31	22.30	48.45	46.0
Tilbury	50	24.23	48.41	50.0
All Farms	204	26.62	53.78	49.5

APPENDIX

Method of Calculating Costs of Sugar Beet Production

The following items of cost were considered in the cost calculations:

Man labour (farm)
Contract labour
Horse labour
Tractor use
Truck or auto use
Hired trucking
Freight
Machinery repairs
Seed
Lime and salt
Green manure
Fertilizer
Machinery (special for beets)
(general)
Hired machinery
Interest on growing costs
Land use
Other

The method of dealing with each of the above items was as follows:

Man Labour,- This refers to the amount of farm labour which went into the production of the 1938 crop of sugar beets whether it be performed by the operator himself, by members of his family, or by hired men. Each operator was asked to estimate the lenght of time devoted to the various operations of growing, harvesting and marketing the beet crop. By breaking down the labour in this way it was possible to calculate the total number of hours of man labour, excluding contract labour, which went into the crop.

In computing labour costs a rate of 15 cents per hour was used for man work. This figure was based on the average wages of a hired man for one year which amounted to $449, including an allowance for board of $10.00 per month.

It was also thought desirable to add a calculation including a charge for management in addition to the operator's own labour. For this purpose a figure of $650 per year seemed appropriate, taking into consideration the average labour earnings of $838 for all farms in the study, and the average yearly wage for hired labour of $449 including board. On the basis of $650 per annum, a rate of 20 cents per hour for the combined factors of labour and management was used.

Contract Labour.- Many farmers followed the practice of contracting the labour of blocking and thinning, hoeing and topping of their beets. This was then merely a cash expense calculated by ascertaining the rate of such contract labour per acre and the number of acres of sugar beets grown in 1938.

Horse Labour.- The amount of horse labour required in the production and disposal of the beet crop was computed in the same way as the man labour. Horse labour costs were computed on a basis of 10 cents per hour, a figure arrived at by comparing various cost account records, former studies, and a limited number of records taken in conjunction with this study.

Tractor Costs.- Where tractors were employed in connection with the sugar beet crop, either in lieu of or in addition to horses, it was necessary to make provision for a suitable charge for their use. The rate per hour for tractor use was calculated by dividing total operating costs for fuel, oil and repairs, plus overhead costs of interest and depreciation, by the number of hours the tractor was operated during the year. The charge to the beet crop was made on the basis of the number of hours the tractor was used for the beet crop. In cases where the operator was unable to provide sufficiently accurate tractor costs the average cost per hour of other tractors of similar size was used. This was found to be 44 cents per hour for the lightest tractors, 56 cents per hour for medium-sized tractors, and 61 cents per hour for large 3-plow tractors.

Car or Truck Use,- Where automobiles and trailers or trucks were used in connection with the sugar beet crop for such purposes as obtaining seed and fertilizer the actual per mile operating costs were calculated from the farmers' estimates of yearly mileage and total expenses of operation and overhead. This charge per mile was applied to the car or truck miles used in connection with the sugar beet enterprise.

Hired Trucking,- A considerable number of growers hired trucks to haul their beets to the railway or factory. The common practice in such cases was to pay the trucker a certain rate on the basis of "dirty" beets although a few growers insisted on truckers being paid on a basis of "clean" beets. In either case the cost of trucking beets was calculated from the tons hauled and the rate per ton.

Freight,- Since there were two basic prices for beets in 1939, $6.25 at factory or $5.50 at railway, it was not necessary to make allowance for railway freight in delivering the beets to the factory.

Machinery, - Certain machinery in use on sugar beet growing farms may be termed "special" beet machinery in that it is solely employed in planting, cultivating or harvesting the beet crop. All the repairs, depreciation and interest on such machinery was considered as chargeable to the beet crop. Depreciation was calculated at 10 per cent and interest at 4 per cent per annum on inventory values of such machinery.

In addition to special beet machinery, a certain portion of the general farm equipment enters into the production of the beet crop. Commonly, this consisted of plows, harrows, cultivators, discs, rollers and packers, wagons, manure spreaders, harness and certain tools. Part of the charges for repairs, depreciation and interest on this general equipment was allocated to the beet enterprise on the basis of the per cent of the crop acreage on the farm devoted to the production of sugar beets in 1938.

Seed, - Since in all cases the sugar beet seed was sold to the grower by the company at 15 cents per pound the cost of seed for the 1938 crop was computed by multiplying the pounds of seed used by the price per pound.

Lime or Salt Applications, - A few growers applied salt or lime to the beet ground in addition to manures and fertilizers. In the case of the lime only those growers situated near the sugar factories used it and they obtained it free for the hauling so that the only expense chargeable was the hauling labour. Where salt was applied it was necessary to ascertain cost of the salt as well as labour employed in hauling, and application.

Green Manure, - In cases where farmers planted a cover crop to plough under for the 1938 beet crop , and did not first pasture or take a hay crop off the field, the cost of the seed of such cover crop was charged in as a beet expense. However, this only occurred in relatively few cases, for as a general rule, clover ploughed down for beets was not the first growth being usually first used for pasture or as a hay crop.

Fertilizer

(a) Manure, - Some growers followed the practice of manuring the beet ground directly before the beet crop while others maintained that better results were obtained by applying manure to the crop preceding the beets.

In the abscemce of any generally accepted commercial price for manure it was necessary to compare farmers' estimates of manure values with practices followed in previous studies. For the purpose of this study the cost of manure applied directly to the 1938 beet crop was calculated on a basis of $1.00 per ton or $1.25 per load plus the man and horse labour used in application which was included in the labour totals.

In cases where growers began preparation of the 1938 beet ground by manuring the preceding crop in 1937 the cost of manure so applied was considered as chargeable to the 1938 beet crop. A rate of $1.25 per ton or $1.50 per load was used for this purpose, since it was found that the average cost of man and horse labour necessary to apply a ton of manure in 1938 was approximately 25 cents.

(b) Commercial Fertilizer, - In the absence of sufficiently accurate data on preceding crop rotations to calculate residual fertilizer values the commercial fertilizer used on the 1938 beet crop was considered as being all chargeable to that crop. By following this procedure, assuming the amount of fertilizer used per farm each year remains relatively constant, the percentage of error probably would be smaller than if an attempt were made to trace out the crop rotations on the beet field for the three or four preceding years and calculate residual values of fertilizers sown each year.

The actual cost of the commercial fertilizer was calculated from information supplied by growers as to type used, amount sown per acre, and price paid per ton.

Hired Machinery, - Some growers did not own their own beet drill, cultivator or lifter and followed the practice of renting such machines from neighbours. This was generally a straight cash expense at so much per acre, and all chargeable to the 1938 crop.

Interest on Growing Costs, - In growing sugar beets a certain amount of capita is tied up in the crop for such items as seed, fertilizer, and contract labour for approximately six months, from May till November. In many cases the beet company advances such capital to the grower, deducting the amount of such advances from the final settlement in the fall. Thus one half year's interest at 6 per cent on the cost of seed, fertilizer and contract labour was included with other costs of the 1938 crop. In calculating cash costs only interest actually paid was included.

Land Use - For owned farms the charge per acre for the use of land for the 1938 beet crop was calculated by applying a 5 per cent rate to the estimated per acre value and adding the taxes per acre. The land value per acre was found by dividing the value of the entire farm by the number of acres contained in it.

In the case of rented farms the rent per acre was used as a basis for the land use charge to sugar beets. In the case of either rented or owned farms an adjusment was made if a large proportion of the land was made up of permanent pasture, since the value per acre of such land would be considered lower than that of crop land.

Beet Top Credits, - Varying degrees of use was made by growers of sugar beet tops. Such uses might be classified as follows:

(1) Complete use for feed - tops either drawn off the field or all fed in the field.

(2) Partial use for feed.

(3) Ploughed under for fertilizer while green.

(4) Not used.

In some cases growers were able to estimate the value to them of the beet tops on a per-acre, a per-ton basis, or as a lump sum. In such instances the grower's estimate was used as a basis of beet top credits. In all other cases, where growers were reluctant to place a value on the tops, the following scale of credits was employed:

(1) Where tops were all drawn off for feed for livestock a credit of $3.00 per acre was allowed.

(2) Where tops were not drawn off but used merely by turning livestock into the field $2.00 per acre was allowed.

(3) No credit was allowed in cases where growers stated they made no use of tops or merely ploughed them under.

Method of Calculating Cash Cost

The following items were included as cash costs and the entire amount charged whenever they occurred :

Contract labour, hired trucking, seed, fertilizer, repairs to beet machinery, hired machinery and"other"expenses actually paid in cash. Items which could not be considered as cash costs in the generally accepted sense of the term included man labour, horse labour and manure.

A number of other cost items were considered as at least partly cash costs. The method used to segregate the cash cost in each case was as follows:

Tractor Work, - Cash costs included the operating expenses of fuel, oil and repairs. Interest and depreciation were not included as cash costs.

Truck or Automobile Operation, - Cash costs included operating expenses, omitting interest and depreciation.

Machinery (General) - The cash cost to the beets was the beet crop's share of the machinery repairs based on the percentage of crop acreage devoted to sugar beets.

Land Use, - The taxes per acre on owned land was considered as a cash cost as was the rental per acre in the case of tenants.

Interest on Growing Costs, - Interest at 5 per cent on blocking, thinning and hoeing for 3½ months was included as a cash cost.

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